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(54) Surface Finishing Fabrics

(57) A patterned surface finish on a fabric is produced by a rubbing action between the fabric 1 and a mechanical action finishing type of operative surface 11 whilst the fabric is pressed in a patterned configuration against the operative surface. The apparatus comprises, on a supporting structure (5, 9), fabric supplying and receiving rolls (2, 3) and at least one pair of rotating rollers (7, 8) pressed against each other and defining therebetween a nip located in the path of the fabric (1), the roller (7) moving in synchronism with the fabric and the roller (8) rotating in the direction opposite to that of movement of the fabric. The roller (8) has an operative surface (11) either of abrasive material or which is completely smooth and the roller (7) has an embossed or grooved surface (12), e.g. to produce a grid pattern.

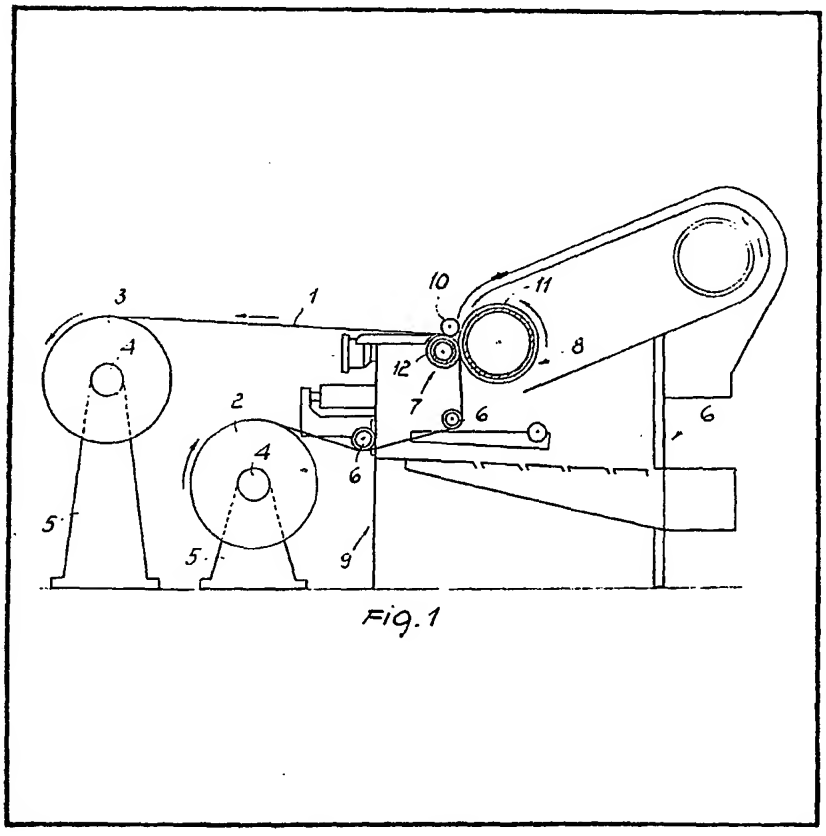

Fig. 1

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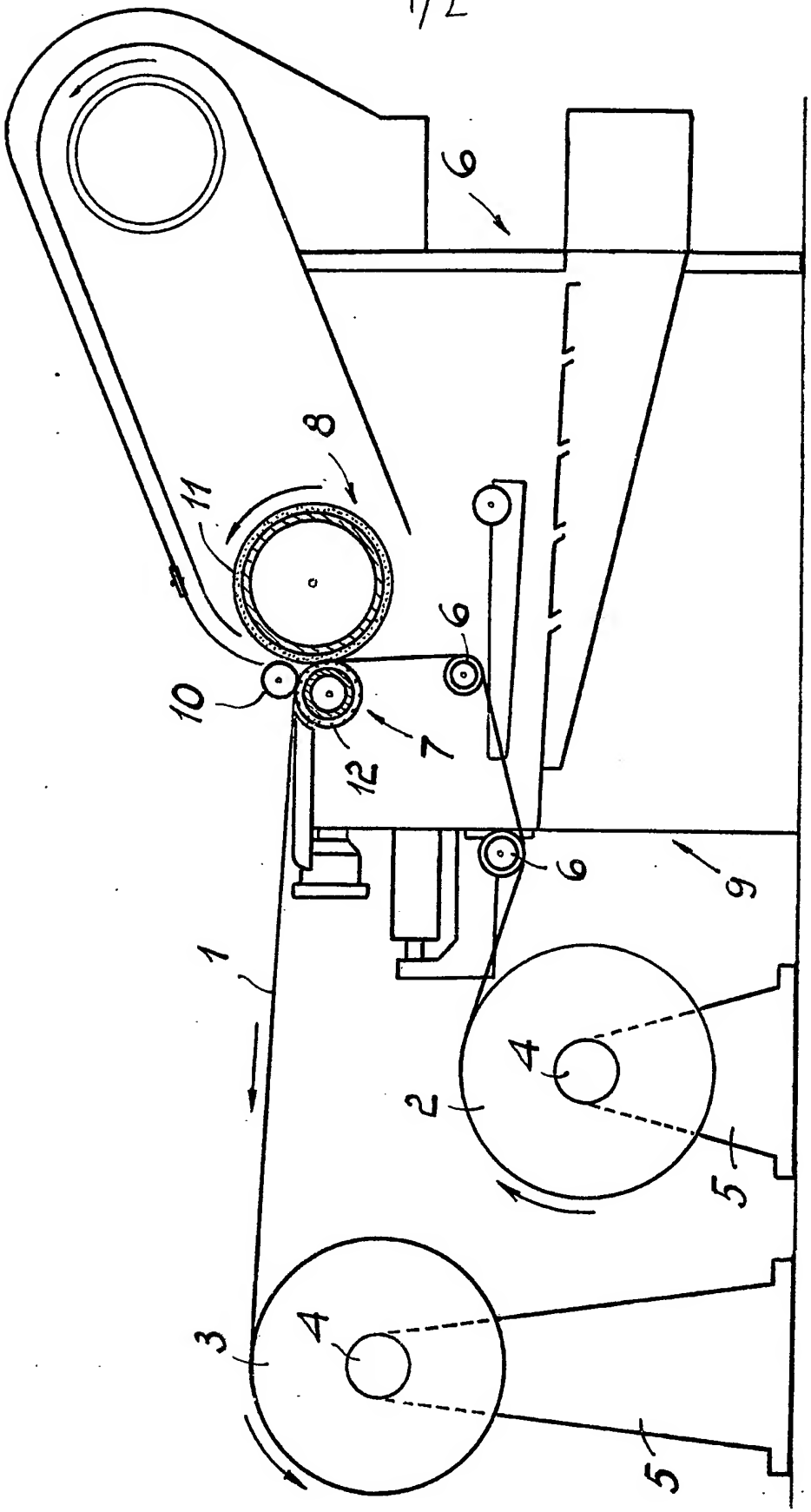

Fig. 1

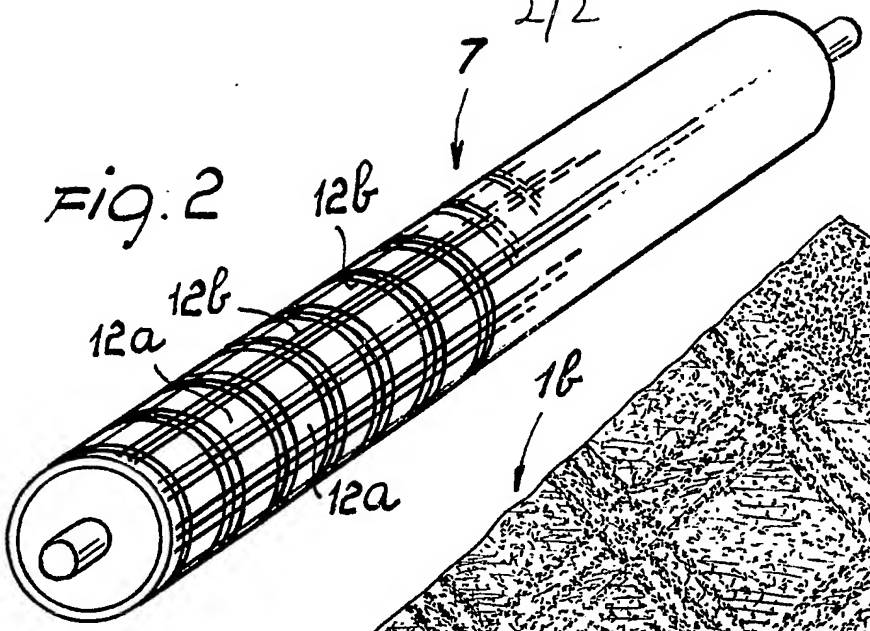

Fig. 2

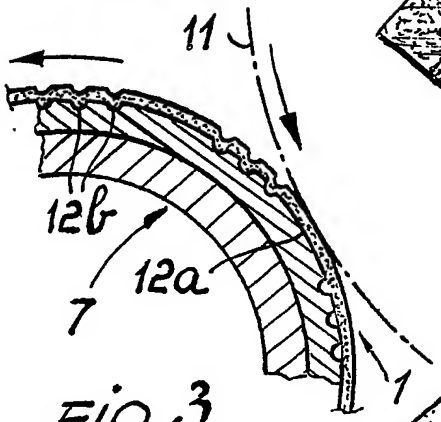

Fig. 3

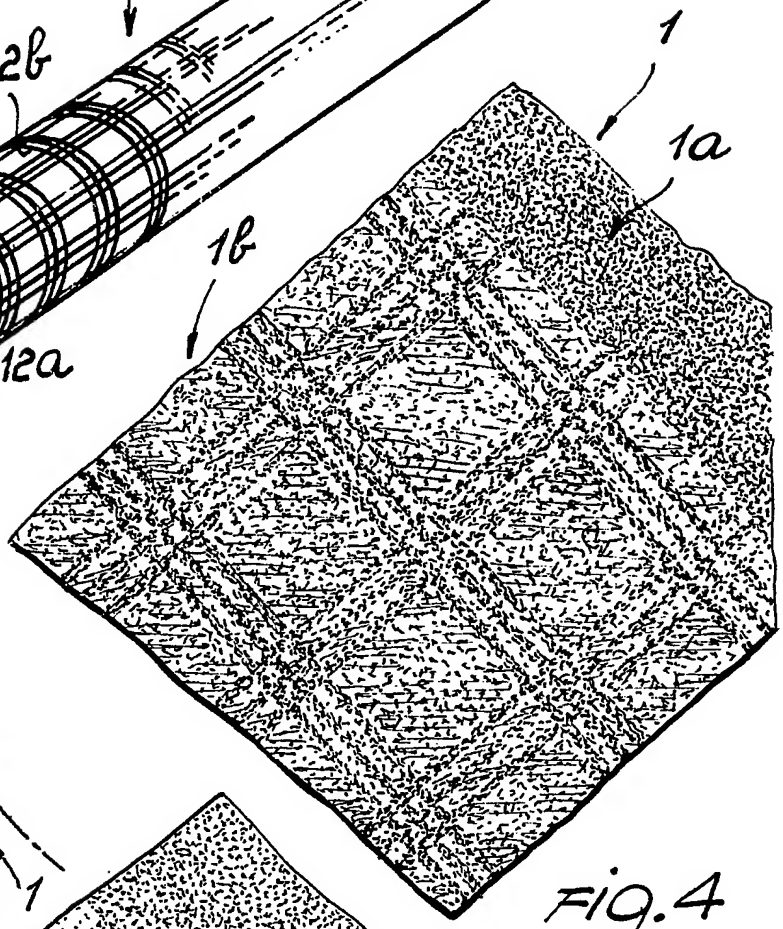

Fig. 4

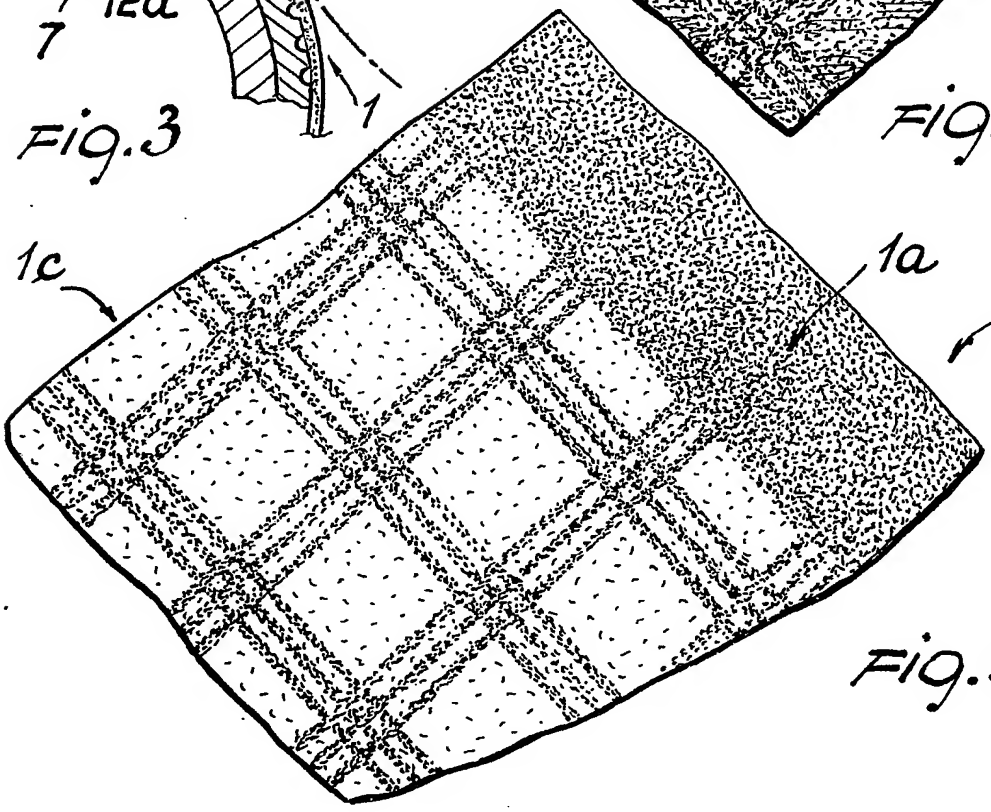

Fig. 5

SPECIFICATION

Meth d and Apparatus, Particularly for Surface Finishing Fabrics and th Like

This invention relates to a method and apparatus, particularly for surface finishing fabrics and the like.

A surface treatment of fabrics called "suède" finishing is known in the art which is based upon the action of an abrasive roller adapted for evenly grazing, or gently rubbing against, one face of the fabric, thus partially unravelling and softening it.

Another fabric surface finish treatment is known, referred to as "glazing", which is performed by means of suitable calenders including rollers which are pressed against each other with considerable force, the fabric being caught in the nip between the rollers. The glazing effect comes from the pressure force compacting and smoothing the fibres in the fabric itself. The fabric glazing calenders, owing to the high pressure employed, constitute a heavy and bulky type of machinery.

Such finishing treatments result in a uniform and constant type of finish exhibiting no variety. Another drawback of said finishes is that each of them requires specially designed equipment for implementing them.

The Applicant has found that when the untreated surface differs from the treated one, special optical and aesthetical effects can be obtained in the fabric which are of such relevance as to completely transform the fabric appearance, whenever areas of the fabric including treated surfaces alternate with untreated fabric areas or at least areas which have been treated to a lesser degree.

In view of the current state of the art, according to which fabrics can only be treated in a uniform manner, and of the advantages that can be secured by only conferring such finishes locally to the fabric, or to selected areas of it, a method and apparatus affording selected pattern finishes for fabrics and the like would be highly desirable.

The technical task of the present invention is to solve the cited problem.

Within the ambit of that task a main object of the invention is to provide a noval apparatus, of simple construction and easy to operate, which is capable of finishing fabrics alternatively on the principle of surface abrading and buffing the fabrics.

The aforesaid task and object are achieved by a method of surface finishing fabrics and the like, which is characterized in that it comprises the steps of producing a relative rubbing action between the fabric and a mechanical action finishing type of operative surface, and f concurr ntly pr ssing in a planimetrically diversified manner the fabric against said operative surface such as to modulate the action of said operative surface on the fabric.

The apparatus, which comprises a supporting structure, fabric advancing and tensioning means, at least n pair of opposite r tating r llers, which are pressed against each other and define a nip between them l cated in the path of said fabric, an activ on of said rollers having a mechanical action finishing type of perative surface, is characterized in that the other of said rollers has a backing surface formed with recesses.

Further features and advantages will become apparent from a description of a preferred, though not limitative, embodiment of the invention, illustrated by way of example only in the accompanying drawings, where:

Figure 1 is a general, schematic side view of the apparatus according to the invention;

Figure 2 shows one element of Figure 1 in perspective;

Figure 3 is an enlarged schematical view of a detail of the machine of Figure 1, shown in section; and

Figures 4 and 5 illustrate two finishings as obtained with the apparatus of the preceding figures.

With reference to Figures 1 to 5, the method and apparatus according to this invention are suitable for surface finishing a fabric 1 of any desired quality and yarn, the latter being preferably subjected in advance to a dyeing process. The inventive apparatus is more clearly visible in Figure 1, in which the fabric is shown unwound from a supply reel 2 and wound onto a suitably driven receiving reel 3. Both reels 2 and 3 are mounted on cylinders 4, pivotally carried in supports 5. As the fabric 1 is unwound from the supply reel 2 to the receiving reel 3, it is guided by small cylinders 6 which also provide for adjustment of the fabric tension.

Specifically, the latter enters the nip between two opposedly located rollers 7 and 8, which impart the desired surface finish proper. The roller 8, referred to herein as the "active roller", is designed to have a larger diameter than the opposed roller 7, referred to herein as the "backing roller". Both rollers are carried in a supporting frame, schematically indicated at 9 in Figure 1, and whereas the active roller 8 is driven to rotate in the opposite direction to the fabric being wound around the receiving reel 3, the backing roller 7 moves in synchronism with the fabric 1, in the same direction and at the same peripheral speed. The fabric 1, in fact, is partially wound around the backing roller 7, and is held in close contact with the same, also by the action of a small holding roller 10 which presses the fabric 1 onto the roller 7.

The active roller 8 is formed with an operative surface 11, which is preferably fitted thereon in a removable manner, sleeve-fashion, to the active roller 8, but may also be integral with the roller. The backing roller 7 has instead an mbossed surfac 12, either added or integral thereto, which modulates the action of the operative surface 11.

In particular, the operative surface 11 can be made, alternatively, of an abrasive material or be a completely smooth surface, whereas the embossed or grooved surface 12 has smooth regi ns and r cessed regi ns, respectively 12*a*

and 12*b*, which are arranged and shaped as desired such as to produce any sel cted pattern.

Figures 2 and 3 illustrate by way of xample a backing roller 7 wherein the sm oth regions 12*a* and recessed regions 12*b* define together a grid pattern of the so-called "Prince of Wales" type. In this instance, the recessed regions 12*b* are simply grooves that intersect one another, shown in cross-section in Figure 3. The contour of these grooves may be any one: what is of importance is that their depth dimensions be sufficient to permit the fabric 1 to be inserted in them as it is pressed by the operative surface 11 of the active roller 8.

Advantageously, when the active roller 8 has a completely smooth operative surface 11, provision is made for the roller to rotate at a very high speed and for applying a substantially reduced pressure on the fabric 1.

The fabric 1 being treated exhibits, after emerging from the nip of the rollers 7 and 8, an impressed pattern that corresponds to the one embossed on the backing roller 7. Depending on whether the operative surface 11 is smooth or abrasive, the pattern will be defined by alternating shiny and matt regions, or by alternative clear and dark regions.

Figure 4 shows schematically in an enlarged scale a fabric 1 which at the portion 1*a* is still to be surface finished, whereas at the portion 1*b*, it has been partly glazed more specifically at the squares between the lines.

Figure 5 similarly shows, schematically and to an enlarged scale, a fabric 1 identical to the fabric of Figure 4 at the portion 1*a* and surface finished by grinding at the portion 1*c*, which grinding has been carried out in cooperation with the opposite backing action of a backing roller 7 of the type shown in Figure 2. In this case, broad areas or regions of the fabric have been made lighter in colour by surface abrasion, whereas a grid pattern of the "Prince of Wales" type retains its colour tone in the region 1*a*.

The apparatus, just described construction-wise, operates as follows.

The fabric 1, as it is unwound from the supply reel 2 toward the receiving reel 3, adheres in non-slipping relationship, to a backing roller 7 which is embossed with any selected pattern. While it is adherent to the backing roller 7, and specifically to the embossed surface 12 of the same, the fabric contacts with its free face the operative surface 11 of the active roller 8 (Figure 3). The active roller 8 rotates in the opposite direction to the direction of advance of the fabric through the contact area, thus rubbing against the fabric to apply abrasion to it, or alternatively, and depending on the type of operative surface 11 being used, surface glazing the fabric 1 itself.

H w v r, at the regions or areas wher the backing roller 7 is recessed, specifically at regions 12*b*, the fabric 1 is allowed to avoid the action of the operativ surface 11, since it can insert itself int the r cessed regions 12*b*, thus moving substantially out of range of th active roller 8. Therefor , in the regions of the fabric 1 overlying the recessed regions 12*b* there will be produced surface portions f the fabric which are left unfinished by th action of the operative surface 11. Thus, if this surface is of an abrasive type it will happen, as shown in Figure 5, that the fabric 1 is not abraded at the recessed regions 12*b*, thus presenting itself as darker and rougher than at the abraded or ground portions. In fact, as is known in the art, grinding causes removal of the surface portions of the fibres which make up the fabric, and uncovers the innermost portions of the fibres which have always a ligher shade of colour than the outer portions, the dyeing process being evidently more effective at the outside than inside of the fibres. The resulting effect will vary depending on the type of dyeing process undergone by the fabric, while still presenting alternating lighter or clearer areas and darker areas configurated in accordance with the pattern embossed on the backing roller 7. Such a surface abrasion has the further effect of weakening and accordingly softening the fibres of the fabric, which will also achieve, at the abraded areas, a softer consistency to the touch, and specifically an aspect similar to velvet.

This latter effect, as obtained through surface abrasion, can be advantageously utilized to produce imitation velvet fabrics, by providing the embossed surface 12 with a series of parallel grooves, concentrical with the roller axis, which are apt to reflect in the fabric acquiring multiple stripe patterns with softer stripes alternating to rougher ones, which generally simulate velvet.

By contrast, if the operative surface 11 is smooth, then the active roller 8 has a glazing action on the fabric 1, and the fabric portions arranged at the recessed regions 12*b* will be left opaque or matt. In general, as shown in Figure 4, a physical and optical effect is achieved in which the pattern of the fabric no longer depends on colour or touch differences but rather on alternating shiny regions and matt or opaque regions.

Advantageously, in the case of a smooth operative surface 11, glazing is obtained, rather than by imparting a heavy relative pressure between the active roller 8 and backing roller 7, as taught by the prior art, by employing, instead of pressure, a considerably high increase in the angular velocity of the active roller 8, which by effecting several passes on the fabric 1, which moves at a much slower speed, produces the glazing effect.

It will be recognized that in the case of fabrics having a substantial thickness, and depending on the depth of the recesses 12*b*, instead of completely releasing the recessed regions from the action of the surface 11, the degree or amount of it can be attenuated at such regions.

With respect to th m thod, it is of no relevanc that these surfaces be the cylindrical surfaces of two opposed rollers: the m thod can be advantageously implemented also by arranging the fabric over an mbossed flat surface and passing an abrasive or buffing blade across

this surface, or in any th r desir d manner. Nor are of import the directions of relative movement of the two surfaces. It will be appreciated from the for going that the backing roller 7 provided with recesses areas causes a planimetrically or superficially diversified backing action for the active roller 8 thereby to modulate the finishing action thereof.

Claims

1. A method of surface finishing fabrics and the like, characterized in that it comprises the steps of producing a relative rubbing action between the fabric to be treated and an operative surface performing a mechanical finishing action, and concurrently pressing in a planimentrically diversified manner the fabric against said operative surface as to modulate the action of said operative surface on the fabric.

2. A method according to Claim 1, characterized in that said mechanical finishing is grinding.

3. A method according to Claim 1, characterized in that said mechanical finishing is glazing.

4. An apparatus for mechanically surface finishing fabrics and the like, comprising a supporting structure, fabric advancing and tensioning means, at least one pair of opposite rotating rollers, which are pressed against each other and define a nip between them located in the path of said fabric, an active one of said rollers having a mechanical action finishing type of operative surface, characterized in that the other of said rollers has a backing surface formed with recesses.

5. An apparatus according to Claim 4, characterized in that said other roller is formed on said backing surface with smooth areas and recessed areas, said areas alternating to each other in accordance with a selected pattern to be impressed in the fabric.

6. An apparatus according to Claim 4, characterized in that the fabric to be finished rests on said backing roller and moves with it, whereas said active roller rotates in the opposite direction to the direction of advance of the fabric, at the contact point with it.

7. An apparatus according to Claim 4, characterized in that said operative surface is an abrasive surface.

8. An apparatus according to Claim 4, characterized in that said operative surface of said active roller is a smooth surface.

9 An apparatus according to Claim 8, characterized in that the rotational speed of said active roller, having a smooth operative surface, is high with respect to the fabric speed of advance.

10. An apparatus according to Claim 4, characterized in that proximate to the backing roller, a holding cylinder is provided effective to urge the fabric against said roller.

11. A method of surface finishing fabrics and the like substantially as herein described with reference to the accompanying drawings.

12. An apparatus for mechanically surface finishing fabrics and the like substantially as herein described with reference to the accompanying drawings.

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